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| U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION TYPE CERTIFICATE DATA SHEET E00051EN | TCDS NUMBER E00051EN REVISION: 1* DATE: OCTOBER 1, 1999 BOMBARDIER-ROTAX GMBH MOTORENFABRIK MODELS: ROTAX 912 F2 912 F3 912 F4 912 S2 912 S3 912 S4 |
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Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E00051EN) and other approved data on file with the Federal Aviation Administration, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER Bombardier- Rotax GmbH
 A-4623 Gunskirchen, Austria

| I. MODELS | 912 F2 | 912 F3 | 912 F4 | 912 S2 | 912 S3 | 912 S4 |
|---|--|--------|--------|----------------------------------|--------|--------|
| TYPE (See NOTE 1) | Four cylinder, horizontally opposed, four stroke engine, reduction gear driven, liquid cooled cylinder head's, ram air cooled cylinders, dry sump pressure lubrication, dual magneto high-voltage condenser ignition, contactless, two constant depression carburetors, electric starter, generator, fuel pump, vacuum pump. | | | | | |
| RATINGS | | | | | | |
| Takeoff power (5 min.) : (sea level pressure altitude) | 59.6 kW/81 HP at 5,800 rpm | -- | -- | 73.5 kW/99 HP at 5,800 rpm | -- | -- |
| Max. continuous power : (sea level pressure altitude) | 58 kW/79 HP at 5,500 rpm | -- | -- | 69 kW/93 HP at 5,500 rpm | -- | -- |
| OIL pressure: | See NOTE 2 | | | | | |
| Max. oil-temperature (° C): | 140 | -- | -- | 130 | -- | -- |
| Max. cylinder-head temperature (° C) : | 150 | -- | -- | 135 | -- | -- |
| COOLANT | | | | | | |
| temperature: | Monitored via cylinder head temperature | | | | | |
| specification: | See NOTE 6 for a reference to coolant specifications (ref. Operator's Manual). | | | | | |
| FUEL | | | | | | |
| pressure: (See NOTE 2) | minimum: 0.15 bar (2.2 psi) maximum: 0.4 bar (5.8 psi) | | | | | |
| specification: | See NOTE 5 | | | | | |
| OIL, Lubrication: | maximum capacity: 3.0 L (2.84 qts) See NOTE 6 for a reference to oil specifications (reference Operator's Manual). | | | | | |

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LEGEND: "--" INDICATES "SAME AS PRECEDING MODEL"

"--" INDICATES "DOES NOT APPLY"

NOTICE: ALL PAGES ARE REFORMATTED. SIGNIFICANT CHANGES, IF ANY
 ARE BLACK-LINED IN THE LEFT MARGIN.

| I. MODELS (Continued) | 912 F2 | 912 F3 | 912 F4 | 912 S2 | 912 S3 | 912 S4 |
|-------------------------------------|---|---|---|--|---|---|
| CARBURETOR | 2 x BING constant pressure carburetor type 64/32 main nozzle 158 or 155 | | | 2 x BING constant depression carburetor type 64/32 main nozzle 155 | | |
| FUEL PUMP | Mechanical pump, Pierburg 720 971.55 - Rotax P/N 996 590 | | | Mechanical pump, Pierburg 720 971.55 - Rotax P/N 996 594 | | |
| IGNITION SYSTEM | Rotax dual magneto high-voltage condenser ignition, contactless SMD type. | | | | | |
| Ignition timing | 26° BTC | | | | | |
| SPARK PLUGS | NGK DCPR 7E | | | NGK DCPR 8E | | |
| ALTERNATOR, external | Nippondenso F3A with integrated regulator. (OPTIONAL - see NOTE 7) | | | | | |
| GENERATOR | Integrated Ducati, permanent single phase generator with external regulator rectifier. | | | | | |
| STARTER | Nippondenso ferrite type 12V / 0.5 kW, engagement via reduction gear and freewheel. | | | | | |
| VACUUM PUMP | Airborne 211 CCW, including drive. (OPTIONAL) - see NOTE 8. | | | | | |
| ENGINE SPEED MEASUREMENT (rpm) | electronic tachometer connector and optional mechanical tachometer drive | | | | | |
| WEIGHT (dry) (See NOTE 4.) | 57.1 kg (125.9 lbs) | 59.8 kg (131.8 lbs) | 57.1 kg (125.9 lbs) | 58.3 KG (128.5lbs) | 61 KG (134.5 lbs) | 58.3 kg (128.5 lbs) |
| DISPLACEMENT | 1211 cm ³ (73.9 in ³) | -- | -- | 1352 cm ³ (82.5 in ³) | -- | -- |
| BORE | 79.5 mm (3.13 in.) | -- | -- | 84 mm (3.3 in.) | -- | -- |
| STROKE | 61 mm (2.40 in.) | -- | -- | 61 mm (2.40 in.) | -- | -- |
| COMPRESSION RATIO | 9.0 : 1 | -- | -- | 10.5:1 | -- | -- |
| PROPELLER ROTATION | CCW | -- | -- | -- | -- | -- |
| PROPELLER FLANGE | P.C.D. 75 mm, 80 mm, and 4 inch diameter for fixed propeller | P.C.D. 75 mm, 80 mm, and 4 inch diameter with drive for hydraulic gov. for constant speed propeller | P.C.D. 75 mm, 80 mm, 4 inch diameter prepared for hydraulic gov. for constant speed propeller | P.C.D. 75 mm, 80 mm, and 4 inch diameter for fixed propeller | P.C.D. 75 mm, 80 mm, and 4 inch diameter with drive for hydraulic gov. for constant speed propeller | P.C.D. 75 mm, 80 mm, and 4 inch diameter with drive for hydraulic gov. for constant speed propeller |
| GEAR REDUCTION (crankshaft to prop) | 2.2727 : 1 | -- | -- | 2.4286:1 | -- | -- |
| PROPELLER CONTROL | --- | --- | adapter and drive for hydraulic constant speed propeller | --- | --- | adapter and drive for hydraulic constant speed propeller |
| GOVERNOR (see Note 10.) | --- | Woodward (Rotax P/N 210 786) | --- | --- | Woodward (Rotax P/N 210 786) | --- |
| OPERATING INSTRUCTIONS | Refer to Operator's Manual for all vesions of Rotax 912 engine models – part number 899.420 in the latest revision. See NOTE 6. | | | | | |

CERTIFICATION BASIS

14-CFR, part 33, Airworthiness Standards: Aircraft Engines, effective February 1, 1965, as amended by 33-1 through 33-15, inclusive, including Federal Aviation Administration Special Condition, NPRM Doc. 24922, Notice 92-14.

| <u>MODEL</u> | <u>DATE OF APPLICATION</u> | <u>DATE TC ISSUED OR REVISED</u> |
|--------------|----------------------------|----------------------------------|
| 912 F2 | November 18, 1993 | February 2, 1995 |
| 912 F3 | November 18, 1993 | February 2, 1995 |
| 912 F4 | November 18, 1993 | February 2, 1995 |
| 912 S2 | December 28, 1998 | August 12, 1999 |
| 912 S3 | December 28, 1998 | August 12, 1999 |
| 912 S4 | December 28, 1998 | August 12, 1999 |

IMPORT REQUIREMENTS

To be considered for installation on United States registered aircraft, each engine (or propeller) to be exported to the United States shall be accompanied by a certification of airworthiness for export, or certifying statement endorsed by the exporting cognizant civil airworthiness authority, which contains the following language:

- (1) This engine (or propeller) conforms to its United States type design (Type Certification Number E00051EN) and is in a condition for safe operation.
- (2) This engine (or propeller) has been subjected by the manufacturer to a final operational check and is in a proper state of airworthiness.

Reference 14-CFR, part 21.500, which provides for the airworthiness acceptance of aircraft engines or propellers manufactured outside of the United States for which a United States type certificate has been issued.

Additional guidance is contained in FAA Advisory Circular 21-23, Airworthiness Certification of Civil Aircraft, Engines, Propellers, and Related Products, Imported into the United States.

Service Bulletins, structural repair manuals, vendor manuals, aircraft flight manuals, and overhaul and maintenance manuals, which contain a statement that the document is Austro Control GmbH approved, are accepted by the FAA and are considered FAA approved. These approvals pertain to the type design only.

NOTES

NOTE 1. Model Description:

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|----|--|
| F2 | Basic model; 4-stroke, 4-cylinder horizontally opposed, one central camshaft, push-rods, overhead valves, liquid cooled cylinder heads, ram air-cooled cylinders, dry sump forced lubrication, dual breakerless capacitive discharge ignition, two constant depression carburetors, mechanical fuel pump, fixed pitch propeller configuration, drive output via reduction gear with integrated shock absorber and overload protection, electric starter, integrated DC generator, vacuum pump drive (optional), external generator (optional). |
| F3 | Same as F2 except; additional drive and adapter for hydraulic governor propeller shaft for constant speed propeller. |
| F4 | Same as F3 except; fixed pitch propeller, prepared for hydraulic governor for constant speed propeller (without drive, adapter and governor). |
| S2 | Similar to F2 except; increased displacement and horsepower, and larger reduction gearbox. |
| S3 | Same as S2 except; additional drive and adapter for hydraulic governor propeller shaft for constant speed propeller. |
| S4 | Same as S3 except; fixed pitch propeller, prepared for hydraulic governor for constant speed propeller (without drive, adapter and governor). |

NOTE 2. Pressure Limits:

Fuel Pressure at inlet to Carburetor: 0.15 bar (2.2 psi) - minimum
0.40 bar (5.8 psi) – maximum

The delivery pressure of a fuel pump connected in series (backing pump) must not exceed 0.3 bar (4.4 psi) to ensure not to override the float valve in the carburetor.

Oil pressure :

normal operation: 2.0 bar –5.0 bar (29-73 psi)*
idling: 0.8 bar (12 psi) – minimum**
starting & warm-up: 7 bar (102 psi) – maximum

For 912F up to engine Number 4412.764:

*normal operation: 1.5 bar –5.0 bar (22-73 psi)
**idling: 1.5 bar (22 psi) - minimum

NOTE 3. Accessory Drive Mounting Provisions:

| Accessory | 912 F2/ S2 | 912 F3/ S3 | 912 F4/ S4 | Rotation, facing drive pad | Speed Ratio, to crankshaft | Maximum Torque | Overhung moment (max.) |
|--|---------------|---------------|---------------|-------------------------------|-------------------------------|-------------------|---------------------------|
| Starter | * | * | * | CW | 25.25 : 1 | 0.5 Nm | --- |
| Alternator | ** | ** | ** | CCW | 1.32 : 1 | 2.0 Nm | --- |
| Vacuum pump | ** | --- | ** | CCW | 0.58 : 1/ 0.54:1 | 0.1 Nm | 0.4 Nm |
| Governor | --- | * | --- | CCW | 0.58 : 1/ 0.54:1 | 2.0 Nm | 1.04 Nm |
| Fuel pump | * | * | * | CW | 0.44 : 1 | --- | 0.14 Nm |
| Tachometer | ** | ** | ** | CW | 0.25 : 1 | --- | --- |
| Water pump | * | * | * | CCW | 0.87 : 1 | 0.5 Nm | --- |
| Oil pump | * | * | * | CCW | 0.50 : 1 | 0.7 Nm | --- |
| "---" indicates "does not apply" "*" standard feature "**" optional feature "CW" clockwise "CCW" counter clockwise | | | | | | | |

NOTE 4. Engine weight is defined as the following configurations:

912 F2 / F4/ S2 / S4: with ignition unit and generator, carburetor, oil tank and electric starter, but

without the muffler and radiator.

912 F3 / S3: with propeller flange P.C.D. 75/80 mm / 4", drive and adapter for hydraulic governor for constant speed propeller.

Alternator (external): 3.0 kg (6.6 lbs).

Center of Gravity (CG): Reference the Installation Manual, latest revision (see NOTE 6).

NOTE 5. Fuel Specifications (see Operator's Manual as defined in NOTE 6):

912 F series engine:

- 100LL AVGAS in accordance with American Society for Testing & Materials (ASTM) D910.
- Automotive gasoline, unleaded, minimum RON 90, in accordance with ASTM D4814.

912 S series engine:

- 100LL AVGAS in accordance with American Society for Testing & Materials (ASTM) D910.
- Automotive gasoling, unleaded, minimum RON 95, in accordance with ASTM D4814.

NOTE 6. Operating and Service Instructions:

Operator's Manual – P/N 899.420 (all models)
Installation Manual – P/N 899.786 (912 F series) P/N 899.366 (912 S series)
Maintenance Manual – P/N 899.422 (all models)
Overhaul Manual – P/N 897.784 (912 F series only)

NOTE 7. **Generator and Alternator Operation:** The optional external alternator was certified with the engine under 14-CFR, Part 33, using some of the standards specified in Aerospace Standard AS 8020. Compliance to the AS 8020 standard for parallel operation of the external alternator and internal generator has not been demonstrated.

NOTE 8. **Vacuum Pump:** The propeller shaft driven Airborn 211 CCW vacuum pump is optional for the 912 F2/S2/F4/S4 series engine models, and not applicable, nor available, for the 912 F3/S3 series engine model. During 14-CFR, Part 33 certification of the 912 series engine models, compliance for the vacuum pump has only been shown to the attachment requirements of 14-CFR, Part 33.25.

NOTE 9. **Governor:** During 14-CFR, Part 33 certification of the 912 series engine models, compliance for the Woodward hydraulic governor has been shown to the attachment requirements of 14-CFR, Part 33.25, and in lieu of 14-CFR, Part 35.42 (as required by Part 33.19(b)), JAR-E (b)(1)(ii) was used for governor functional testing.

NOTE 10. **Overhaul:** The Rotax 912 series engine must be overhauled in accordance with the approved overhaul manual or returned to the manufacturer for overhaul.

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